Claims

1. Apparatus for ensuring data received from a data transmission network is stored on a storage device without the introduction of any errors, the apparatus comprising

a buffer; and
a controller connected to a storage device and the buffer,

wherein the data is stored in the buffer before and after transmission of the data to the storage device; and

wherein the data is deleted from the buffer only after a write confirmation message is received from the storage device at the controller.

2. Apparatus as claimed in claim 1, wherein the data transmission network comprises a link with a low bit error rate.

3. Apparatus as claimed in claim 1, wherein the data transmission network comprises first and second diversely routed paths.

4. Apparatus as claimed in claim 1, wherein the data transmission network comprises an acknowledgement free link.

5. Apparatus as claimed in claim 1, wherein the storage device is located at a remote location from the buffer.

6. Apparatus as claimed in claim 1, wherein the data is re-transmitted to the storage device from the buffer in response to a retransmission request from the storage device.

7. Apparatus as claimed in claim 1, wherein the buffer stores an ID number with the data being stored in the buffer.

8. Apparatus as claimed in claim 7, wherein the ID number is transmitted to the storage device.

9. Apparatus as claimed in claim 7, wherein the ID number identifies which data to delete from the buffer.

10. Apparatus as claimed in claim 7, wherein the ID number identifies which data to retransmit from the buffer.

11. Apparatus as claimed in claim 1, comprising two buffers, two controllers and two separate storage devices.

12. Apparatus according to claim 11 further comprising a communications link from a first controller to a second controller.

13. Apparatus as claimed in claim 12 wherein the communications link carries write confirmation messages from one controller to the other.

14. Apparatus as claimed in claim 12 wherein the communications link carries write failure messages from one controller to the other.

15. Apparatus as claimed in claim 12 wherein the communications link carries data lost messages from one controller to the other.

16. Apparatus as claimed in claim 15 wherein the communications link further carries data, transmitted in response to a data lost message.

17. A method for ensuring data received from a data transmission network is stored on a storage device without the introduction of any errors, comprising the steps of

storing the data in a buffer,

transmitting the data to a storage device,

writing the data to the storage device, and

deleting the data from the buffer in response to a write confirmation message from the storage device.

18. A method according to claim 17 further comprising the steps of retransmitting the data in response to a retransmission request from the storage device.

19. A method according to claim 17 further comprising the step of storing an ID number in the buffer, corresponding to the data being stored in the buffer.

20. A method according to claim 19 further comprising the step of transmitting the ID number to the storage device.

21. A method according to claim 19 further comprising the step of utilizing the ID number to identify which data to delete from the buffer.

22. A method according to claim 19 further comprising the step of utilizing the ID number to identify which data to retransmit from the buffer.

23. A method according to claim 17 further comprising the step of sending a signal to the data transmission network to stop sending data.

24. A method according to claim 17 further comprising the step of sending a message from a first storage device, which has

stored the data correctly, to a second storage device, to indicate the data has been stored correctly.

25. A method according to claim 17 further comprising the step of sending a message from a first storage device, which has not stored the data correctly, to a second storage device to indicate that the write has failed.

26. A method according to claim 17 further comprising the step of sending a message from a first storage device, which has lost the data, to a second storage device to indicate that the data has been lost.

27. A method according to claim 17 further comprising the step of sending the data from a storage device which has not lost the data, to a storage device that has lost the data.

28. A data mirroring system comprising

a primary data storage site,

an acknowledgement free transmission system,

a remote data storage site comprising a buffer and a storage device,

wherein data is transmitted from the primary data storage site to be replicated on the remote storage site,

wherein the primary data storage site does not wait for an acknowledgement before sending further data.

29. A data transmission network as claimed in claim 28 wherein a warning message is sent to the primary storage site when the remote storage site is malfunctioning.

30. A data transmission network according to claim 29, wherein the warning message causes the primary storage site to transmit data to an alternative remote data storage site.

31. A method of operating a data mirroring system, comprising the steps of

transmitting from a transmitter to a receiver,

writing the data to a storage device,

sending further data without waiting for an acknowledgement signal,

sending a warning message from the receiver to the transmitter if the remote storage site malfunctions.

32. A method according to claim 31 further comprising the step of transmitting data to an alternative remote storage site after a warning message is received.